2024 RIMS-IBSCGP Conference on Recent Developments in Symplectic Topology

November 4 - 8, 2024 IBS POSTECH Campus

Registration

Before October 20th, 2024, https://cgp.ibs.re.kr/activities/registration/367



Organizers

Dongwook Choa (IBS Center for Geometry and Physics) Yong-Geun Oh (IBS Center for Geometry and Physics & POSTECH) Kaoru Ono (RIMS, Kyoto University)

Invited Lecturers

Mohammed Abouzaid (Stanford University) Cheol-Hyun Cho (Seoul National University) Egor Shelukhin (Université de Montréal)

Invited Speakers

Jongmyeong Kim (Seoul National University) Yoosik Kim (Pusan National University) Takahiro Oba (Osaka University) Yukihiro Okamoto (RIMS, Kyoto University) Semon Rezchikov (Princeton University) Taisuke Shibata (RIMS, Kyoto University) Taisuke Shibata (RIMS, Kyoto University) Toru Yoshiyasu (Kyoto University of Education) Jun Zhang (University of Science and Technology of China) Zhengyi Zhou (Chinese Academy of Science)

Webpage

https://cgp.ibs.re.kr/conferences/2024CRDST/

Venue IBS POSTECH Campus Bldg, #301, Pohang, South Korea

Contact us Soonok Jung at sojung@ibs.re.kr







Monday Morning, November 4

Time	Speaker	Title & Abstract
10:00 - 11:00	Takahiro Oba (Osaka University)	Symplectic fillings of unit cotangent bundles of spheres This talk is concerned with symplectic fillings of contact manifolds. After briefly giving an overview of results on the topology of symplectic fillings, I will present joint work with Myeonggi Kwon, where we give some topological re- strictions on symplectic fillings of unit cotangent bundles of spheres. In particular, we show a uniqueness result on dif- feomorphism types of them, under certain condition, for the case where the base manifold is a 3-sphere. Addition- ally, I will explain an application of our result to exact symplectic cobordisms.
11:20 – 12:20	Jongmyeong Kim (Seoul National University)	Cluster categories from Fukaya categories A cluster category can be obtained as the quotient of a cer- tain (non-proper) triangulated category by a proper subcat- egory satisfying a relative Calabi-Yau property. In this talk, I will explain this construction can be applied to the wrapped and compact Fukaya categories of a Liouville manifold with a nice generator. This is based on a joint work with Hanwool Bae and Wonbo Jeong.



Monday Afternoon, November 4

Time	Speaker	Title & Abstract
		Spectral capacities of submanifolds
14:00 – 15:00	Jun Zhang (University of Science and Technology of China)	In this talk, we will discuss how to measure the size of sub- manifolds in a symplectic manifold. This is based on symplectic invariants that are constructed from spectra ex- tracted from (Hamiltonian) Floer theory. Moreover, these invariants are concrete examples of spectral capacities. We will use these capacities to demonstrate the fundamental differences between Lagrangian submanifolds and symplectic submanifolds (or more generally nowhere coi- sotropic submanifolds). Meanwhile, we will also prove a quantitative Lagrangian control estimate that intriguingly relates these invariants. This talk is based on joint work with Dylan Cant.
		Power operations and Hamiltonian dynamics
15:15 – 16:15	Egor Shelukhin (Université de Montréal)	Power operations in Floer cohomology have recently seen fruitful applications to Hamiltonian dynamics. We will describe this emerging subfield along with a few recent developments. Some of the results we will mention are based on joint works with Jingyu Zhao, Marcelo Atallah, and Nicholas Wilkins.
		Homological Lagrangian monodromy
16:30 – 17:30	Yoshihiro Sugimoto (Nagasaki University)	Given a Lagrangian submanifold and a Hamiltonian dif- feomorphism which preserves the Lagrangian submani- fold, we have a monodromy of the singular homology of the Lagrangian submanifold. In this talk, I explain that the monodromy is trivial if the Hofer norm of the Hamiltonian isotopy is sufficiently small. I also treat the monodromy of Lagrangian quantum homology (Floer homology).



Tuesday Morning, November 5

Time	Speaker	Title & Abstract
10:00 - 11:00	Zhengyi Zhou (Chinese Academy of Sci- ence)	Kahler compactification of C^n and Reeb dynamics. I will present two results in complex geometry: (1) A Kahler compactification of C^n with a smooth divisor complement must be P^n, which confirms a conjecture of Brenton and Morrow under the Kahler assumption; (2) Any complete as- ymptotically conical Calabi-Yau metric on C^3 with a smooth link must be flat, confirming a modified version of Tian's con- jecture regarding the recognition of the flat metric among Calabi-Yau metrics in dimension 3. Both proofs rely on relat- ing the minimal discrepancy number of a Fano cone singular- ity to its Reeb dynamics of the conic contact form. This is a joint work with Chi Li.
11:20 – 12:20	Yukihiro Okamoto (RIMS, Kyoto University)	Legendrian non-isotopic unit conormal bundles in higher dimensions For any compact submanifold of R^n, its unit conormal bundle is a compact Legendrian submanifold of the unit conormal bundle of R^n. In this talk, I will give examples of pairs of compact connected submanifolds of R^n of codimension greater than 3 such that their unit conormal bundles are not Legendrian isotopic, although these two Legendrian sub- manifolds cannot be distinguished by classical invariants. The main tools to distinguish them are the strip Legendrian contact homology and a coproduct on it, which are defined under certain conditions on Legendrian submanifolds. I will show that, in a special case including the main examples, the coproduct can be computed by using the idea of string topol- ogy.



Tuesday Afternoon, November 5

Time	Speaker	Title & Abstract
14:00 – 15:00	Egor Shelukhin (Université de Montréal)	Power operations and Hamiltonian dynamics Power operations in Floer cohomology have recently seen fruitful applications to Hamiltonian dynamics. We will describe this emerging subfield along with a few re- cent developments. Some of the results we will mention are based on joint works with Jingyu Zhao, Marcelo Atallah, and Nicholas Wilkins.
15:15 – 16:15	Yoosik Kim (Pusan National University)	Cluster algebras and monotone Lagrangian tori Cluster algebras, introduced by Fomin and Zelevinsky as a combinatorial framework for understanding the dual canon- ical basis, are powerful tools in symplectic topology. In this talk, I will explain how cluster algebras can be used to con- struct and distinguish monotone Lagrangian tori in a smooth Fano variety that is a compactification of a cluster variety. Using the framework, I will construct distinct infi- nitely many monotone Lagrangian tori in most partial flag va- rieties. This talk is based on ongoing joint work with Yunhyung Cho, Myungho Kim, and Euiyong Park.
16:30 – 17:30	Taisuke Shibata (RIMS, Kyoto University)	Existence of infinitely many simple positive hyperbolic or- bits in convex Reeb flows A closed 3-dimensional Reeb orbit can be classified into three types: positive hyperbolic, negative hyperbolic, and el- liptic. Cristofaro-Gardiner, Hutchings, and Pomerleano proved that if a contact 3-manifold has a positive first Betti number, then there exists at least one simple positive hyper- bolic orbit. They also conjectured that every contact 3-man- ifold (with limited exceptions) contains such an orbit. In this talk, we will show that certain Reeb flows on lens spaces with convexity have infinitely many simple positive hyperbolic or- bits.



Wednesday, November 6

Time	Speaker	Title & Abstract
10:00 - 11:00	Toru Yoshiyasu (Kyoto University of Education)	Contact contractions and Liouville domains Recently, Yang Huang gave a new construction of Liouville domains. It is a suspension of a compact contact manifold by a contactly contracting map, called a contact contraction. In this talk, I will give a necessary condition for the existence of such maps and some examples of Liouville domains via Huang's construction. This is a joint work in progress with Noboru Ogawa.
11:20 – 12:20	Semon Rezchikov (Princeton University)	Applications of Symmetries in Symplectic Floer Homology Often, geometric situations have symmetries, and these symmetries enhance the invariants of the geometric situa- tion at hand. This talk will explain how symmetry enhances Floer theoretic invariants to objects of the genuine equivar- iant stable homotopy category, and will explain various ap- plications of this technique to concrete problems in enumer- ative geometry (namely, to the quantum Steenrod opera- tions) and to symplectic and low-dimensional topology.



Thursday, November 7

Time	Speaker	Title & Abstract
10:00 – 11:00 16:30 – 17:30	Mohammed Abouzaid (Stanford University)	Floer homotopy via flow modules I will describe joint work with Blumberg, starting with the re- sults appearing in arXiv:2404.03193, whose goal is to build a foundation for the study of the interaction between gener- alised homology and Floer theory. The key idea is to inter- pret flow categories, due to Cohen-Jones-Segal, as objects of a category whose morphisms we call flow bimodules. While Morse and Floer complexes give rise to flow categories, con- tinuation maps between them give rise to flow bimodules. These constructions have many flavours, as one can consider flow categories whose morphisms spaces are manifolds, equipped with various tangential structures, or more gener- ally orbifolds or derived orbifolds. These variants are de- signed to accommodate specific Floer-theoretic applica- tions, such as studying Floer theory on Liouville manifolds, or on general closed symplectic manifolds, as I will illustrate by discussing Hamiltonian Floer cohomology.
11:20 – 12:20 14:00 – 15:00	Cheol-Hyun Cho (Seoul National University)	Floer theory for singularities I,II,III Lecture 1. We give an introduction for singularity theory and an overview on some of the recent symplectic develop- ments. Lecture 2. We consider popsicle maps with insertions and their compactifications. This leads to a construction of Fu- kaya category of Landau-Ginzburg orbifolds of log Fano and Calabi-Yau Type (joint work with Choa and Jeong) Lecture 3. Variation operator associated with an isolated singularity is an isomorphism between the relative homol- ogy and the absolute homology of the Milnor fiber. We study a Lagrangian Floer theoretic version of this operator. We will examine the case of plane curve singularities. (joint works with Bae, Choa,Jeong and Portilla)
15:15 – 16:15	Egor Shelukhin (Université de Montréal)	Power operations and Hamiltonian dynamics Power operations in Floer cohomology have recently seen fruitful applications to Hamiltonian dynamics. We will describe this emerging subfield along with a few re- cent developments. Some of the results we will mention are based on joint works with Jingyu Zhao, Marcelo Atallah, and Nicholas Wilkins.

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Friday, November 8

Time	Speaker	Title & Abstract
		Floer theory for singularities I,II,III
10:00 – 11:00	Cheol-Hyun Cho (Seoul National University)	Lecture 1. We give an introduction for singularity theory and an overview on some of the recent symplectic develop- ments. Lecture 2. We consider popsicle maps with insertions and their compactifications. This leads to a construction of Fu- kaya category of Landau-Ginzburg orbifolds of log Fano and Calabi-Yau Type (joint work with Choa and Jeong) Lecture 3. Variation operator associated with an isolated singularity is an isomorphism between the relative homol- ogy and the absolute homology of the Milnor fiber. We study a Lagrangian Floer theoretic version of this operator. We will examine the case of plane curve singularities. (joint works with Bae, Choa,Jeong and Portilla)
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CONFERENCE GENERAL INFORMATION

Meals Provided During the Conference

X If you have a companion who is not attending the conference, please arrange for separate payment.

Morning Snack

Some sandwiches and fruits will be provided to conference registrants from November 4th to 8th. Time: 9:30-9:50 am

<u>Lunch</u>

Lunch will be provided to conference registrants from November 4th to 8th. Menu: Small-scale buffet or Lunch Box, Main menu will be slightly changed each day. Time: 12:20-13:20 pm

Dinner on November 7 for all participants

PLEASE SIGN UP for the dinner at the reception. Menu: Beef Bulgogi Hot Pot or Galbi BBQ (소불고기 전골 또는 갈비바베큐) Restaurant: Gayoungsanjang (가영산장) Time: 6:00 ~ 8:00 pm

Time: 6:00 ~ 8:00 pm

Conference Shuttle

A shuttle bus is arranged to facilitate transportation during the conference for limited locations and schedule.

Departure Time SHARP	11/4 (Mon) 11/5 (Tu	Departure Time SHARP	11/7 (Thu)	Departure Time SHARP	11/6 (Wed) 11/8 (Fri)	
9:10	Hotel Yeongildae	9:10	Hotel Yeongildae	9:10	Hotel Yeongildae	
	▼		▼		▼	
9:20	POSTECH HQ Bldg.	9:20	POSTECH HQ Bldg.	9:20	POSTECH HQ Bldg.	
	▼		▼		▼	
9:30		9:30		9:30		
17:50	IDS DIUg.	17:50	IBS Blug.	14:00	IDS DIUg.	
	▼		▼		▼	
18:10	POSTECH Digital Libra	ary 18:10		14:20	POSTECH Digital Library	
	▼	19:40	Banquet Place		▼	
18:30	Hotel Yeongildae		▼	14:30	Hotel Yeongildae	
		20:00	Hotel Yeongildae			

X There may be slight changes depending on the conference or traffic situation.



Miscellaneous

Wireless Internet Access

- Network Name: Guest_ibsWiFi
- ID: Guest_ibsWiFi
- PW: 0123456789@

Banking

Banking (Global ATM) near IBS POSTECH Campus Bldg.



Available Offices for Speakers

For speakers who need some space, please check 'OFFICE FOR THE SPEAKERS' sign on the doors around CGP area. Please understand that the office may need to be shared by two as there're limited number of rooms.

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Dining on campus

POSTECH Dining Services - Facilities Operation Time

	Stor	e	0	Operation hours		Closing Day	
		Full-	Breakfast	07:30~09:30 (Saturday/Sunday/Holiday 08:00~09:30)	_	Open throughout the	
		(Students only)	Lunch	11:30~13:30	-	year	
			Dinner	17:30~19:00			
		Bob berger	Lunch	11:30~13:30	-	Weekend/Holiday	
		Chinese Cuisine		Not in oper	ration		
			Breakfast	07:30~10:30			
		Geu Yeo Deun	Lunch	11:30~13:30	-	Weekend/Holiday	
			Dinner	17:30~19:00			
Jigok Com-	Haedong-	Wisdom		11:50~13:00	-	Weekend/Holiday	
Center	Hall	C532*	Staff Service	08:00~02:00		Open throughout the	
		(Jigok Community Center)	Self-Check- out	02:00~08:00	-	(Closed on Lunar New Year's Day & during Thanksgiving)	
		BURGER KING		11:00~20:00	-	Open throughout the year	
		Monet Cafe		08:00~19:00		Weekend/Holiday	
			Lunch	11:30~14:00		Saturday(lunch)/Sun-	
		e-Spc	e-Sports COLOS- SEUM	Dinner	17:30~02:00	14:00 ~17:30	day/Holiday Closed on Saturdays during vacation
POSCO The Blue Hill			11.20~12.20		Weekend/		
International Center			11.50 15.50		Holiday		
		GS25*	Staff Service	08:00~22:00		Open throughout the year	
Student	(Stude	ent Union Bldg.)	Self-Check- out	22:00~08:00	-		
Union Bldg	со	ffee nearme		08:00~19:00	-	Weekend/ Holiday	
	Oasis	MAKKI/ Geu Yeo Deun		11:30~13:30	-	Weekend/ Holiday	
Resea	urch	GS25*	Staff Service	09:00~18:00		Open throughout the	
Bld	g.	(ME Engineering Lab. Bldg.)	Self-Check- out	18:00~09:00	-	year	
		GS25*		08:00~22:00 (Saturday/Sunday/Holiday 10:00~19:00)	_	Open throughout the	
Tae-Jun Pa Libra	rk Digital ary	Library	Self-Check- out	22:00~08:00 (Saturday/Sunday/Holiday 19:00~10:00)		year	
		coffee nearme Li-		08:00~21:00	-	Open throughout the	
		brary	(Saturday/Su	nday/Holiday 10:00~17:00)		year	
PAL,Scier	nce Hall	coffee nearme PAL&NINT		11:30~15:30	-	weekend/ Holiday	
Log Cabin 18:00~02:00		-	Sunday/Holiday				

* GS25: Convenience Store



Message for Taxi Driver When You Arrive in Pohang

Destination	Korean Sentence for the driver	What the sentence means
IBS POSTECH Campus Bldg. * Conference Venue #301	기초과학연구원 포스텍 캠퍼스로 가주세요. (가속기 연구소 안쪽, 선형가속기 지나서) 감사합니다. 기초과학연구원 포스텍 캠퍼스 주소: 경북 포항시 남구 지곡로 127번길 79 (가속기 연구소 출입구 지나서 안쪽, 선형가 속기 지나서)	Please take me to the IBS POSTECH Campus Bldg. Thank you.
Hotel Yeongildae	호텔영일대로 가주세요. 주소: 경북 포항시 남구 행복길75번길 11 영 일대호텔	Please take me to the Hotel Yeongildae. Thank you.
IBS POSTECH Campus Bldg. via Hotel Yeon- gildae	호텔영일대 호텔에 잠시 들렀다 기초과학연 구원 포스텍 캠퍼스(가속기 연구소 안쪽, 선 형가속기 지나서)로 가주세요.	Please stop by at Hotel Yeon- gildae briefly, then take me to the IBS POSTECH Building. Thank you.
POSCO International Center (Hotel) at POS- TECH	포항공대 포스코 국제관 호텔로 가주세요. 감사합니다.	Please take me to the POSCO International Center (Hotel). Thank you.
IBS POSTECH Campus Bldg. via POSCO Interna- tional Center (Hotel) at POSTECH	포스코국제관 호텔에 잠시 들렀다 기초과학 연구원 포스텍 캠퍼스(가속기 연구소 안쪽, 선형가속기 지나서)로 가주세요.	Please stop by at POSCO In- ternational Center (Hotel) briefly, then take me to the IBS POSTECH Building. Thank you.
(Waiting)	여기서 잠시만 기다려주세요	Please wait here for a mi- nute.
(Safety)	천천히 안전하게 가주세요	Please drive slowly and safely.

Contact

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Please visit our workshop website: https://cgp.ibs.re.kr/conferences/2024CRDST/



Conference Schedule

Time	Nov 4 (Mon)	Nov 5 (Tue)	Nov 6 (Wed)	Nov 7 (Thu)	Nov 8 (Fri)
9:30 – 10:00	Welcome and Registration				
10:00 - 11:00	Takahiro Oba	Zhengyi Zhou	Toru Yoshiyasu	[LS-B] Mohammed Abouzaid	[LS-C] Cheol-Hyun Cho
11:00 - 11:20	Break / Teatime				
11:20 - 12:20	Jongmyeong Kim	Yukihiro Okamoto	Semon Rezchikov	[LS-C] Cheol-Hyun Cho	[LS-B] Mohammed Abouzaid
12:20 -14:00	Lunch				
14:00 - 15:00	Jun Zhang	[LS-A] Egor Shelukhin		[LS-C] Cheol-Hyun Cho	
15:00 - 15:15	Break / Teatime			Break / Teatime	
15:15 - 16:15	[LS-A] Egor Shelukhin	Yoosik Kim	Free	[LS-A] Egor Shelukhin	Free Discussion & Closing
16:15 – 16:30	Break / Teatime		Afternoon	Break / Teatime	
16:30 - 17:30	Yoshihiro Sugimoto	Taisuke Shibata		[LS-B] Mohammed Abouzaid	
17:30 – 20:00				Photo Session & Banquet	

Please visit our workshop website: https://cgp.ibs.re.kr/conferences/2024CRDST/



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